MAIN BATTLE TANKS

SYSTEM	ARMAMENT*	WEIGHT (MT)	NIGHT SIGHTS	RANGE (km) (KE Round)	PROTECTION TURRET (mm) (KE/HEAT)	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
M1A1 (US)	120 mm Gun 12.7 mm MG	62.6	1 GEN FLIR	3	600/1300	EG, SA, KW	Use of higher horsepower diesel engines.
LEOPARD 2A5 (GM)	120 mm Gun 7.62 mm MG	59.5	1GEN FLIR	3	700+/1000+	GE, SW, NE, SP	Add-on armor and ERA.
CHALLENGER 2E (UK)	120 mm Gun 7.62 mm MG	62.5	1 GEN FLIR	3+	500/800	UK, OM	Fire and blast suppression.
M60A3 (US)	105 mm Gun 12.7 mm MG	52.6	1 GEN FLIR	3	325/325	IS, SA, EG, TU, BK	Laser warning receiver and bi-spectral smoke grenades.
AMX-30B2 (FR)	105 mm Gun 7.62 mm MG	36	1 GEN FLIR	2.5	120/120	FR, CY	
LECLERC (FR)	120 mm Gun 7.62 mm MG	54	1/2 GEN FLIR	3.5	INA	FR, TC	Active protection system and infrared countermeasures suite.
T-80U/UD/T-84 (RS)	125 mm Gun 12.7 mm MG	46	2 GEN II/FLIR	3 / 4 ATGM	730/1030+	FSU, CH, PK, CY, SK	Upgrade to autoloader and larger gun.
T-80BV (RS)	125 mm Gun 12.7 mm MG	44.5	2 GEN II	3 / 4 ATGM	530/1030	FSU	Use of a battle management system.
T-72BM/T-90S (RS)	125 mm Gun 12.7 mm MG	46.5	2 GEN II/FLIR	3 / 5 ATGM	730/1060	FSU, IN	Installation of a commander's independent viewer, TV fire control system, and target tracking.
T-72BV/T-72S (RS)	125 mm Gun 12.7 mm MG	46.5	2 GEN II	3 / 4 ATGM	520/1060	FSU, IR	
T-72M IMPROVED (RS)	125 mm Gun 12.7 mm MG	48	2 GEN II/FLIR	3	410/1000	EZ, LO, YO, PL, FSU	Use of 1st or 2nd generation FLIR.
T-72M1 (PL/CZ)	125 mm Gun 12.7 mm MG	41.5	2 GEN II	3	500/560	FSU, IZ, PL, IN, EZ and 2 others	Improved KE, HE, and other rounds
T-72Z/TYPE 59II (IR/CH)	105 mm Gun 12.7 mm MG	36	2 GEN II	3	203/203	IR, CH, PK	Electronic fuzed rounds.
T-62A (RS)	115 mm Gun	37.5	1 GEN II/IR	1.6 - 2.0	230/230	NK, AF, IR, IZ, SY and 11 others	Gun-launched antitank guided missiles.
T-55AMV (RS)	100 mm Gun 12.7 mm MG	40.5	1 GEN II/IR	2.5 / 4 ATGM	200/700	EZ, PL, SY, FSU	**UPGRADE PRIORITY**
T-54/55/55A (RS)	100 mm Gun 12.7 mm MG	36	IR	1.5	200/200	FSU CH, IN, NK, LY and 40 others	1. Improved rounds and ATGM, 1st gen FLIR, laser warning receiver, 2nd generation ERA, bispectral grenades.
Composite Tank	125 mm Gun 12.7 mm MG	46.5	2 GEN II	3 / 4 ATGM	600/1000		2. Improved fire control system with commander's independent thermal viewer 3. Upgrade engine and gun.

* All Tanks have 7.62 mm coax MG, except AMX-30B2 (20 mm auto gun) and Leclerc (12.7 mm) , Type 59II has two bow-mounted 7.62 mm MGs.
* T-55AMV, T-72BV/BM/S, T-80BV/U/UD, T-84, T-90S and various other tanks (with 100, 105, 115, and 120 mm guns) can employ gun-launched ATGMs.

INFANTRY FIGHTING VEHICLES

SYSTEM	ARMAMENT*	NIGHT SIGHTS	RANGE (km) (By round)	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
M2A2/BRADLEY (US)	25 mm Auto TOW 2B ATGM	1 GEN FLIR	3 3.75	SA	Use of higher horsepower diesel engines. Add-on armor and ERA.
MARDER 1A3 (GM)	20 mm Auto MILAN 2 ATGM 7.62 mm MG	2 GEN II	2 AP, 2+HE 2	GM, SW, NE	Laser warning receiver and bi-spectral smoke grenades.
CV 9030/9040 (SW)	30-/40 mm Auto	1 GEN FLIR	2 APDS, 4 HE	SW, NO	Improved mine protection.
AIFV (US)	12.7-/25 mm Auto	II/1 GEN FLIR	2-3	NE, EG, SK, TU	Upgrade to autoloader, larger gun, and auto grenade launcher.
DESERT WARRIOR (KU)	25 mm Auto TOW 2A ATGM	1 GEN FLIR	3 3.75	KU	Installation of a commander's independent viewer, TV fire control system, and target tracking.
WARRIOR (UK)	30 mm	2 GEN II	1.1	UK, KU	Use of a battle management system.
AMX-10P (FR)	20 mm Auto	2 GEN II	1.3	FR, ID, GR, SA, IZ	Use of 1st or 2nd generation FLIR.
BMP-3 (DESERT BMP-3) (RS)	30 mm Auto 100 mm 2x 7.62 mm MG	1 GEN FLIR	2 AP, 4 HE 4-5.5 HE, ATGM	RS, KU, CY, UAE	Employment of improved rounds, electronic fuzed rounds, and antitank guided missiles.
BMP-2 (RS)	30 mm Auto AT-5/5B ATGM	2 GEN II	2 AP, 4 HE 4 ATGM	RS, PO, IN, IZ, CZ and 4 others	
BMP-1P (RS)	73 mm AT-5/5B ATGM	IR	1 HEAT, 1.3 HE 4 ATGM	RS, IZ, LI, CZ, EG and 2 others	
M-80A (YO)	20 mm Auto AT-3 ATGM	II/IR	1.5-2 3 AT-3/MALYUTKA-2	YO	**UPGRADE PRIORITY** 1. First generation FLIR for gunner and commander. 2. Install add on armor, and auto grenade launcher. 3. Upgrade ATGM, and round to APFSDS-T.
Composite IFV	30 mm Auto AT-5 ATGM	2 GEN II	2 AP, 4 HE 4 ATGM		

* All IFVs have a 7.62 mm coax MG

SELF-PROPELLED ARTILLERY

SYSTEM	ARMAMENT	MUNITION	RANGE	PROLIFERATION
M109 A2-A5 (US)	155 mm	FRAG-HE HERA	18,100 m 23,500 m	IR, KS, TW, IS, GM and 15 others
DANA (wheeled) (EZ)	152 mm	FRAG-HE HE ER	17,300 m 20,000 m	EZ, LY, PL, SL
2S19 (RS)	152 mm	FRAG-HE FRAG-HE BB SAL-H	24,000 m 29,000 m 20,000 m	FSU
2S1 (RS)	122-mm	FRAG-HE SAL-H	15,300 m 14,000 m	FSU, SY, HU, LY, IZ and 21 others
2S3 (RS)	152 mm	FRAG-HE SAL-H	17,400 m 20,000 m	FSU, IZ, AG
G-6 (wheeled) (SF)	155 mm	FRAG-HE FRAG-HE BB SAL-H	30,000 m 39,000 m 17,000 m	SF, TC, OM
2S5 (RS)	152 mm	FRAG-HE FRAG-HERA SAL-H	28,400 m 30,500 m 20,000 m	FSU, FI
AUF 1/GCT (FR)	155 mm	FRAG-HE HE-BB	23,000 m 31,500 m	FR, IZ, SA, KU
M110A (US)	203 mm	FRAG-HE HERA	22,900 m 30,000 m	GM, KS, J O, IR and 10 others
Composite Self-propelled artillery system	152-mm	FRAG-HE HE-BB DPICM SMOKE SAL-H	24,000 m 30,000 m 20,000 m	

EMERGING TECHNOLOGY/ TRENDS

Artillery delivered high precision munitions (ADHPM) e.g. semi-active laser homing (SAL-H), sensor-fuzed munitions, terminally homing projectiles.

Conventional munition and propellant improvements like controlled fragmentation, multi-option fuzes, and modular propellants.

Automated fire control with barrel cooling and thermal warning systems.

Auxiliary power unit.

Mobility and weight improvements.

Muzzle velocity analyzer.

Smoke grenade launcher.

UPGRADE PRIORITY

1. Procurement of ADHPM.
2. On-board navigation and fire direction systems.
3. Use of modular propellant.
4. Mobility and weight improvements.

TOWED ARTILLERY

SYSTEM	ARMAMENT	MUNITION	RANGE	PROLIFERATION
M101 HOWITZER (US)	105 mm	HERA 14 FRAG-HE	14,600 m 11,270 m	US, GM, FR, TH, RP and 3 others
M-46 FIELD GUN (RS)	130 mm	FRAG-H ERFB-BB	27,500 m 38,000 m	FSU, IS,CH,IN, YO and 3 others
G-5 GUN-HOWITZER (SF)	155 mm	FRAG-HE BB ERFB SAL-H	39,000 m 30,000 m 17,000 m	SF, IR, IZ, CA and 2 others
D-30 (RS)	122 mm	FRAG-HE SAL-H	15,300 m 14,000 m	FSU, CH, IR, IZ, EG and 53 others
D-20 (RS)	152 mm	FRAG-HE SAL-H	17,400 m 20,000 m	FSU, YO, CH, UP, BU and 17 others
M115 (US)	203 mm (8 inch)	FRAG-HE	16,800 m	US, TU, KS, TW, J O and 5 others
FH-70 (UK)	155 mm	FRAG-HE BB FRAG-HE	31,500 m 24,700 m	GM, UK, IT, SA, MY and 1 other
2A36 (RS)	152 mm	HERA FRAG-HE SAL-H	30,500 m 28,400 m 20,000 m	FSU, FI
GH N-45 (AU)	155 mm	ERFB-BB ERFB	39,600 m 30,000 m	SA, AU, IR, IZ, J O and 2 others
Composite Towed artillery system	155 mm	FRAG-HE HE BB DPICM SMOKE SAL-H	24,000 m 39,000 m 30,000 m 24,000 17,000	

EMERGING TECHNOLOGY/ TRENDS

Artillery delivered high precision munitions (ADHPM).

Conventional munition and propellant improvements.

Automated fire control.

Auxiliary propulsion unit.

Mobility and weight improvements.

Barrel cooling and thermal warning systems.

Muzzle velocity analyzer.

UPGRADE PRIORITY

1. Procurement of ADHPM.
2. Use of modular propellant.
3. Addition of auxiliary propulsion unit.
4. Mobility and weight improvements.

MULTIPLE ROCKET LAUNCHERS

SYSTEM	ARMAMENT	MUNITION	RANGE	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
BM-21 (RS)	122 mm	FRAG-HE	32,700 m 20,300 m	FSU, CH, KN, LY, SY and 41 others	Artillery delivered high precision munitions (ADHPM). Conventional munition and propellant improvements.
LARS (IS)	160 mm	ACULAR	45,000 m	IS	Self-locating launcher.
ASTROS (BR)	127 mm 170 mm 300 mm	FRAG-HE FRAG-HE FRAG-HE	30,000 m 35,000 m 90,000 m	BR	On-board fire direction. Mobility and weight improvements.
TYPE 63/70 (19 round) (CH)	130 mm	FRAG-HE FRAG-HE	10,000 m 15,000 m	CH, KN, VM	Smoke grenade launcher.
TYPE 83 (4 round) (CH)	273 mm	FRAG-HE	40,000 m	CH	
WM-80 (CH)	273 mm	FRAG-HE DPICM	80,000 80,000	CH, AM	
9A52-2 (RS)	300 mm	FRAG-HE CON-FRAG AT MINES	70,000 m	FSU, KU, AG	
Composite MRL	122 mm	FRAG-HE AP MINES	30,000 m 30,000 m		

UPGRADE PRIORITY

1. Sensor-fuzed munitions, thermobaric warheads, DPICM.
2. Course correcting rockets.
3. Self-locating launcher.
4. On-board fire direction.

COUNTERBATTERY DETECTION

SYSTEM	RANGE MORTAR	RANGE TUBE ARTY	RANGE MRL	RANGE TAC MISSILE	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
WEAPON LOCATING RADARS						Artillery reconnaissance systems that are 24 hour, all-weather capable.
ARK-1M	12 - 13 km	7 - 9 km	20 - 30 km	40 km	FSU	
ZOOPARK-1	12 - 15 km	8 - 10 km	18 - 20 km	35 km	FSU	
IL-220-U	30 km	18 - 20 km	30 - 40 km	55 km	FSU	Capability to rapidly disseminate information within 1 minute or less.
BL-904	15 km	16 - 25 km	30 km	INA	CH	
CYMBELINE	14 km	20 km	20 km	INA	UK	
AN/TPQ-36	12 km	12 km	24 km	INA	US	Ground surveillance radars.
AN/TPQ-37	30 km	30 km	50 km	INA	US, IT, CH, SA	
ARTHUR		20 km	30 km		SW, NO	Phased-array weapons locating radars.
SOUND RANGING						Aerial reconnaissance with real-time downlink.
SORAS	30 km				SW	
SCHZ-6	25 km				FSU	Unmanned aerial vehicles.
Composite						**UPGRADE PRIORITY**
Weapon locating radar	10 - 15 km	15 - 20 km	20 - 30 km	40 km		1. Range increase with lower probability of error
Sound ranging system	25 km					2. Windows-based man-machine interface

ANTI TANK GUIDED MISSLES

SYSTEMS	GUIDANCE	MOUNT F=FW H=Heli V=Vehicle G=Ground	NIGHT SIGHT	RANGE	PENETRATION (MM) /WARHEAD	PROLIFERATION	EMERGING TECHNOLOGIES/ TRENDS
HELLFIRE/HF LONGBOW (US)	Laser SA homing/ MMW homing	H	FLIR	8 km 8 km	1000 1000	EG, RO, SY, SA, TW and 9 others/--	1. Manportable/ground launch.
AT-16 VIKHR (RS)	Laser beam rider	A, H	II/FLIR	10 km	1000 TD	FSU, PL, IN, YO, HR and 2 others	2. Break-down launcher.
AT-6 SHTURM/VARS/ATAKA (RS)	RF SACLOS	H	II/FLIR	5/6/7 km 6 km	750/1000 TD 950 TD HEAT	FSU, PL, IN, YO, HR and 2 others	3. Elevated launcher.
AT-6 SHTURM/ATAKA (RS)	RF SACLOS	V	II/FLIR	5 km 5-6km	750/950 TD	FSU, PL, IN, YO, HR and 2 others	4. 1st or 2nd generation FLIR.
TOW/ITOW/TOW-2/2A (US)	Wire SACLOS	V, H, G	FLIR	3.75 km	600/800/900/920	EG, IR, PK, TU, SA and 38 others	5. Target tracking radar.
TOW-2B (US)	Wire SACLOS	V, H, G	FLIR	3.75 km	Explosive-formed penetrator		6. Missile autoloader.
HOT/HOT-2/HOT-3 (Euro)	Wire SACLOS	V, H, G	II/FLIR	4 km	800HEAT/900 TD /1250 TD	EG, IZ, SY, SA, GM and 7 others	7. Guidance counter-countermeasures.
RED ARROW-8A/E (CH)	Wire SACLOS	V, H, G	II/FLIR	3/4 km	800/900 TD	PK, CH, BK	8. Extended range.
KORNET (RS)	Laser beam rider	V, H, G	II/FLIR	5.5 km	1200 TD	FSU	9. Reduced noise, smoke, flash.
AT-5/KONKURS-M (RS)	Wire SACLOS	V, H, G	II/FLIR	4 km	650/925 TD	FSU, SY, IZ, YO, IN and 19 others	10. Increased ATGM velocity.
MANPORTABLE/PORTABLE							
JAVELIN (US)	IIR fire and forget	G	FLIR	2 km	INA TD HEAT	US	11. Soft-launch for MOUT use.
AT-4/FACTORIYA (RS)	Wire SACLOS	G, V	-/FLIR	2/2.5 km	450/550 TD	FSU, HR, IN, IR, IZ and 18 others	12. Tandem warhead ATGM.
MILAN/MILAN-2/3 (Euro)	Wire SACLOS	G, V	-/FLIR	2 km	600/800/880 TD	BK, EG, IN, SY, IZ and 34 others	13. EFP or HEAT top-attack.
AT-3/MALYUTKA-2 (RS)	W MCLOS SACLOS	V, H, G	DAY	3 km	400/520/800 TD	FSU,SY, YO, CH, NK and 40 others	14. Thermobaric HE warhead.
AT-7/AT-13 (RS)	Wire SACLOS	G	DAY	1.5/2 km	460/1000 TD	FSU, SK, PL, BU, TO	15. Semi-active laser homing.
ERYX (FR)	Wire SACLOS	G	II/LLL	0.6 km	900 TD	BR, CA, FR, MY, NO	16. Fire and forget seeker.
Composite System							**UPGRADE PRIORITY**
HELI/FW AIR/VEH	RF SACLOS	H, V	FLIR	7 km	950		4, 6, 7, 10, 12, 14, 17
GROUND/VEH/HELI	Wire SACLOS	G, V, H	FLIR	4 km	925		4, 1, 2, 6 (LCH VEH), 7, 12, 14
MANPORTABLE/PORTABLE	Wire SACLOS	G	FLIR	2.5 km	880		4, 1, 2, 7, 9, 11, 12, 14

TACTICAL BALLISTIC MISSLES

SYSTEM	PAYLOAD/ WARHEADS	GUIDANCE	PROPULSION	PROLIFERATION	RANGE/ ACCURACY	EMERGING TECHNOLOGY/ TRENDS
SS-21 SCARAB (RS)	482 kg HE/NUC	Inertial guidance system.	Single stage solid booster.	FSU, CZ, GM, HU, PO, and 5 others	15-70 km 150 m CEP Ballistic or cruise missile.	Survivability countermeasures. Shoot and scoot.
SS-1C SCUD-B (RS)	985 kg HE/CHEM/NUC	Inertial guidance system.	Single stage liquid.	FSU, CZ, HU, AF, VM and 20 others	300 km 1000 m CEP	Extended range. Autonomous operations.
SS-21C MOD 2/3 (RS)	482 kg HE/CHEM/NUC EMP/ARM	Terminal guidance. ARM guidance. Preprogrammed maneuvers.	Single stage solid booster.	FSU	20-120 km 95 m CEP	Advanced munitions. Separating warhead.
SCUD Variants						
AL Hussein (IZ)	135 kg-500 kg HE/CHEM	Inertial guidance system.	Single stage liquid.	IZ	600 km 500-1000 m	Increased accuracy to 30 m CEP. Solid fuel propellant.
SCUD-B MOD2 (RS)	600 kg Separates from motor and fuel tank following burnout.	Active radar terminal seeker.	Single stage liquid.	FSU	300 km 50 m CEP	Decreased prep time.
NODONG1 (KN)	770 kg HE/CHEM Separates from motor and fuel tank following burnout.	Inertial guidance system.	Single stage liquid.	KN, IR, PK	1300 km 3-4 km CEP	
M-9/11 (CH)	500 kg HE/CHEM	Inertial guidance system, with on board computer terminal terminal guidance	Solid Propellant.	CH	600 km 300 m CEP	
Composite TBM system	800 kg HE/CHEM/NUC Separates from Body of TBM	Inertial guidance system, with on board computer terminal terminal guidance	Single stage liquid.		300 km 450 m CEP	

UPGRADE PRIORITY

1. Solid Fuel Propellant
2. Separating Warhead and Larger Payloads.
3. Survivability Counter-measures.

MANPADS

SYSTEM	GUIDANCE/RANGE	FIRE CONTROL	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
SA-7B GRAIL (RS)	Passive Homing IR in medium IR range. Range: 5,500 m IFF:yes, can be fitted to gunner's helmet.	Sights with magnification. Launcher has sighting device and a target acquisition indicator.	Worldwide	Systems are inexpensive and easily proliferated. Modifications and enhancements are available.
SA-14 GREMLIN (RS)	Passive Homing IR. Range: 6,000 m IFF: Yes	Sights with magnification. Launcher has sighting device.	FSU, CU, KN, YO, SY, and 25 others	Thrust vectoring capability. All aspect engagement capability.
SA-16 GIMLET (RS)	Passive Homing IR. Range: 5,200 m receding, 4,500 m approaching IFF: Yes	Sights with magnification. Front hooded ring, rear optical.	FSU, IZ, KN, SA, VM and 29 others	Strap-on thermal sights, FLIR. Upgraded IFF capabilities.
SA-18 GROUSE (RS)	Passive Homing IR. Range: 6,000 m IFF: Yes	Sights with magnification. Launcher has fore and rear sights.	FSU, YO, GM, BZ, FI, and 5 others	Improved seeker heads with better counter-countermeasures, and Infrared countermeasure suites. Improved warheads and blast effects.
MISTRAL (FR)	Passive Homing IR, all aspect capability. Range: 5,500 m	Optics.	FR, HU, KS, SA, SP and 15 others	Early warning datalinks and communications abilities.
BLOWPIPE (UK)	Command to Line of Sight. Range: 4,000 m	Optics.	UK, AF, CR, TH, PO and 6 others	Uncooled seeker heads.
JAVELIN (UK)	Command to Line of Sight. Range: 4,000 m	Optics.	UK, PE, CA, KS, JO and 3 others	Improvements in fuels, materials, and aerodynamics for increases in speed, maneuverability, and accuracy.
VANGUARD (CH)	Passive Homing IR. Range: 5,000 m	Sights.	CH	**UPGRADE PRIORITY** 1. Flare rejection capability. 2. Strap-on FLIR. 3. Faster engagement capability. 4. Increased explosive yield. 5. Multi-detector materials.
Composite MANPADS	Passive Homing IR. Range: 6,000 m Thrust vectoring, all aspect engagement, super-elevation not required.	Sights with magnification. Linked electronic data display for target cueing.		

ADA TACTICAL MISSLES

SYSTEM	GUIDANCE/RANGE	FIRE CONTROL	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
SA-8B GECKO (RS)	Radar tracking, RF CLOS. Monopulse target tracking radar. Range: 15,000 m	Sights with magnification, LLTV/optical assist. IFF: Yes	FSU, IN, IZ, SY, YO and 14 others	Developments to SP AA gun/missile Systems.
SA-15 GAUNTLET (RS)	Radar tracking, RF CLOS. Phase arrayed radar. Range: 12,000 m	Sights with magnification. EO television system.	FSU, CU, IN, UP	Digital signal processing in radars. Ability to track and engage multiple targets.
SA-6A GAINFUL (RS)	Semi-active radar homing. Range: 25,000 m	Sights with magnification. EO sighting system on vehicle, commander and driver have IR. IFF: Pulse doppler	FSU, IZ, IN, YO, VN and 18 others	Active terminal seeker. (ACLOS) Dual and multi-band seekers.
CROTALE (FR)	Radar tracking, RF CLOS. Range: 11,000 m	Sights with magnification. EO television system. IFF: yes	FR, FI, KS and 15 others	Low probability of intercept radar. Semi-active radar terminal homing.
ROLAND (FR/GM)	Radar tracking, RF CLOS. Range: 6,000 m	EO tracking system	FR, GM, IZ, BZ, AR and 5 others	Thrust vectoring missiles. Improved warheads.
SA-9 GASKIN (RS)	Passive IR homing. Range: 5,000 m	Sights with magnification.	FSU, IZ, LY, SY,PO and 29 others	Vertical missile launch. Laser engagement systems.
SA-13B GOPHER (RS)	Photo contrast or dual IR homing. Range: 6,000 m IFF: Yes (RF)	Sights with magnification, and EO/IR system.	FSU, LY, JO, IZ, HR and 15 others	
2S6 Tunguska M1 w/ SA-19 (RS)	Radar or Optical Tracking RF guided CLOS Missiles: 10,000 m, Guns: 3,000 m	Sights with magnification and stabilized optical sight. Commander's IR day/night sight, HOT SHOT (TAR/TTR).	FSU	
Composite Missile and Gun/missile systems	On-board auto or optical gunner target tracking. Radar controlled guns fire on move. Range: Missiles 15,000 m Range: Guns: 3,000m	Image-intensified, IR capable optical sights. Combined TAR/TTR, with IFF.		

UPGRADE PRIORITY

1. Enhanced electronic protection of radars from jamming and ARMs.
2. All-weather fire control capability.
3. Improved optics, 1st Gen FLIR.
4. Vertical missile launch.

TACTICAL SINGLE CHANNEL COMMUNICATION SYSTEMS

SYSTEM	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
PRC-77 (US, IS, GM)	Manpack VHF, 30-75.95 MHz Radio, no encryption.	GM, IS, IR, IZ, JO and 11 others	Encryption device for EP.
VRC-4600 (TU)	Modular VHF, 30-76 MHz Radio, manpack, vehicular, embedded encryption.	TU, IZ	Some fixed frequency radios will be replaced with frequency hopping radios.
R-107 (RS)	Manpack HF/VHF, 20-52 MHz Radio, no encryption.	BU, CU, CZ, EG, IZ and 8 others	A mix of first generation slow FHs and more advanced frequency agile systems will be acquired.
R-123M (RS)	Vehicle HF/VHF, 20-51.5 MHz Radio, no encryption.	IR, IZ, CU, PL, YO and 11 others	Move to acquire frequency agile systems.
RU-3 (YO)	Manpack/vehicle, VHF 30-79.975 MHz Digital radio.	YO, IZ	
TRC-350 (FR)	Manpack HF/SSB, 1.5-30 MHz Radio, encryption capable	FR, IZ	
VRC-90 (CH)	Vehicle VHF, 30-87.975 MHz 16 kbps data capability	CH, BU	
Type 889 (CH)	Tactical VHF voice 20-49.975 MHz Wide band data, connected to digital terminal. 16 kbps data capability	CH, IZ	**UPGRADE PRIORITY** 1. Single channel radio to become obsolete in many regional areas and be replaced with first generation FH w/encryption to provide ECCM capability. 2. Older systems may be retained for back-up or redundant communications.
Composite single channel communication system	Modular VHF, 30-76 MHz Radio, manpack, vehicular, embedded encryption.		

TACTICAL MULTI CHANNEL COMMUNICATION SYSTEMS

SYSTEM	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
ST701 (FR)	LOS tactical station vehicular/manportable 610-960 MHz, and 1.35-1.85 or 4.4-5GHz. Capable of 256,512,1024,2048 kbits/s. Crypto and adaptive power and spread spectrum for EP	FR	Adaptive modem allows transmission of bulk data over longer distances. Adaptive power control and steerable null antennas are some ECCM capabilities with the development of new technology.
R-423-1 Mobile Tropo Relay (RS)	A mobile troposcatter relay station 4.4-4.5/4.6-4.7 GHz with an effective system distance of 200 km, 18 or 36 phone channels. Three vehicle system.	FSU	
R-417 Mobile Radio Relay (RS)	FM mobile radio relay station 4.4-4.5/4.6-4.7 GHz digital mode 480 kbits/s. Five vehicle system	FSU	
MH300 (IT)	Digital UHF/SHF radio 225-400/610-960 MHz, and 1350-2700/4400-5000 MHz. Capable of 256 to 8448 kbits/s of data. Built-in ECCM characteristics, an IF scheme w/highly selective filtering, and continuous auto tuning over the entire RF band. Auto power control for LPI.	IT and others	
Composite Multi-channel communications system	Similar system to the MH300, with capabilities to connect HF and VHF CNR.		**UPGRADE PRIORITY** 1. Obtain ECCM capabilities as described above. 2. Obtain adaptive modem transmission of bulk data

TACTICAL FREQUENCY HOPPING COMMUNICATION SYSTEMS

SYSTEM	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
JAGUAR - V (UK)	Manpack/vehicular, VHF FH 30-88 MHz, 100hps. Embedded encryption, remote 4km.	IZ, JO, SA, IS, CH and 22 others	Radios will have adaptive FH, hybrid spread-spectrum modulation, direct-sequence spread-spectrum modulation, or fast FH with adaptive power control.
ACM 43/ACV 46 (SA)	Manpack/vehicular, VHF FH 30-87.975 MHz, 99 preset channels. Embedded encryption, remote 2km.	SA, IZ, EG	Radios will also permit reduced operator-interface function (i.e., HF comms use of ALE, SEL, and adaptive algorithms).
PRC-73B (YO)	Manpack, VHF FH 30-90MHz, 100-200 hps. No encryption.	IR	
SCIMITAR - V (UK)	Manpack/vehicular, VHF FH 30-88 MHz, 150-250 hps. Embedded encryption.	IZ, IR, JO, BA, BR, IN	
ART2000 (IR)	Manpack/vehicular, VHF FH 30-88 MHz, 100+hps. Embedded encryption.	IR	
RU-5 (YO)	Manpack, VHF FH 30-87.975 MHz, 100hps. Embedded encryption.	Unknown	
TRC-900 series (FR)	Manpack/vehicular, VHF FH 30-88 MHz, 300hps. Encryption capable.	FR, IZ, KU, CH, SY	
Composite Freq-hopping system	Manpack/vehicular, VHF FH 30-88 MHz, 100hps. Embedded encryption, remote 4km.		

UPGRADE PRIORITY

1. Upgrade the Hop Rate speed and bandwidth.
2. Acquire next-generation spread spectrum radio in 5 years to include adaptive power control algorithms.
3. Provide for more effective ECCM capability.

TACTICAL SATELLITE COMMUNICATION SYSTEMS

SYSTEM	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
ASIASAT series (CH)	SATCOM C & KU band, 12.2-14.3 GHZ VSAT, 3.6-6.425 GHZ, Telecom, TV.	CH, TH, MG	New series of comms satellite will have VSAT down below division within 5 years.
Iridium Constellation (US)	Mobile communications L-band system with GPS.	US, CH, J A, FR, UK and 22 others	Cellular phone will be available through connectivity with Iridium system at reduced cost.
INMARSAT	International Maritime SATCOM 1-2 GHZ and 6 GHZ uplink, 1-2 and 3 GHZ downlink.	CH, US, UK, AU, CA and others	INMARSAT could be used for military communications.
MANSAT (UK)	Lightweight SHF tactical SATCOM terminal provides global secure comms for miliatry/government	UK,FR,SP	
Composite SATCOM system	VSAT via ASIASAT-like system and cellular phone over civil systems providing secure communications and easy access.		**UPGRADE PRIORITY** 1. SATCOM will use hybrid SS , steerable-null antenna and operate above 30 GHZ to provide ECCM capability.

UNMANNED AERIAL VEHICLES

SYSTEM	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
CL289 (FR, GM)	SAR/MTI imaging radar UAV, with all weather, real-time intelligence. Note: SAR integration is currently ongoing. Resolution for ground range 1.4 m, and MTI 10 m.	FR, GM	Enhanced third-generation image intensifiers and second-generation thermal imagers may be available to limited countries.
Delta Seeker (Lark) (SA)	EW and expendable UAV, double delta wing capable of mission payload like TV camera or thermal sensor. Included is a warhead payload with anti-radiation sensor to target radars. Flight duration is 1.5 to 4 hours.	SA and 2 others	Multiple sensors will be employed on the same platform for enhanced target detection under all-weather conditions and may be linked to weapon delivery platforms.
TU-143/DR-3 Reys (RS)	Tubo-jet powered tactical recon UAV w/max range 360 km, payload-photo, real-time TV, and EW (reconnaissance/surveillance) package.	RS,IZ	Laser target designators for smart munitions in priority target areas.
NISHANT UAV (IN)	Indiginous UAV w/FLIR, daytime EO, ELINT/COMINT, mini panoramic camera, and laser rangefinder/designator.	IN, SY	
SEARCHER (IS)	Shoulder-wing monoplane with pusher-engine UAV, max endurance 14 hrs, payload-realtime TV/FLIR, or LTD with TV or FLIR.	IS, TH Singapore,IN	
Composite UAV	CL289 capabilities with some limitations of emerging trends i.e. only 1st generation EO and sensor to shooter lag time.		**UPGRADE PRIORITY** 1. Refine limited first & second generation EO capability for near real time sensor to shooter capability. 2. Obtain 3rd/4th generation EO capability.

BATTLEFIELD SURVEILLANCE RADARS

SYSTEM	DESCRIPTION/CAPABILITY	PROLIFERATION	EMERGING TECHNOLOGY/TRENDS
RASIT (FR)	All weather day/night target detection/classification max range 20 km-personnel, 40 km-vehicles, 20-30 km helicopters. Provide indirect target acquisition/fire adjustment capability.	FR, AU, CH, GM, IZ and 14 others	Capability to handle more targets and detect targets with greater accuracy Satellite/inertial location/navigation.
RATAC-S (GM)	Doppler radar w/target detection range arty shell 8-15 km, soldier 18 km, light vehicle 24 km, MBT 30 km, vehicle convoy 38 km.	GM, TU	Integrate C3 or C4 and digital mapping. Develop sensor suites which combine surveillance radars and TV/EO imagers.
RP-200 (RS)	All weather mobile radar monopulse system able to detect personnel 12 km, light vehicle 20 km, MBT 25 km, helicopter 23 km, arty fire adjustment 7-20 km.	FSU	Mast-mounted radars/sensor suites on highly mobile reconnaissance vehicles or reconnaissance command vehicles.

Composite

BSR RATAC-S - TYPE

UPGRADE PRIORITY

1. Greater accuracy/multi-mode capability.
2. Multi-target/detect with greater accuracy.

RECONNISANCE AIRCRAFT

PLATFORM	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
MiG-25 Foxbat B/D (Russia)	MiG-25RB Foxbat B with one of three interchangeable photo/ELINT modules MiG-25RBV and RBT Foxbat B. SRS-9 ELINT and Virazh SLAR on RBV, Tangazh ELINT on RBT. MiG-25RBK Foxbat B with no cameras, different ELINT package, and Kub SLAR. MiG-25RBSh with Shompol SLAR.	FSU, SY, IN, LY, AL	Associated costs preventing most nations from obtaining dedicated, multi-purpose sensor platforms. Small, modular sensor packages, as well as pods/systems fulfilling specific collection requirements.
Su-24 Fencer (Russia)	Su-24MR Fencer E has RDSBO SLAR, Zima IR recon system, Aist-M TV recon system, AFA AP-402M panoramic, and AFA A-100 oblique cameras. Can be fitted with Kadr camera, and Tangazh ELINT pod. Su-24MP Fencer F has an electronic warfare and SIGINT capability, and is replacing older Yak-28PP Brewer E platforms. Limited production.	FSU	Increasing use of smaller single- or multi-engine air platforms. Integration with, and direct links to ground-based control and reporting systems.
Tornado (International)	GR.Mk.1A carries the Bae SLIR (sideways-looking infrared) system, Vinten Linescan 4000 surveillance system, and a signal processing and video recording system. Vinten VICON 18 Srs 601GP(-1) long-range photo pod.	UK, SA, GE, IT	Move toward unmanned platforms.
Mirage 2000 (French)	Mirage 2000R variant developed for export as a reconnaissance variant of the 2000E. Carries the Thomson-CSF Raphael SLAR pod, Dassault COR2 multicamera pod or AA-3-38 Harold long-range oblique Lorop pod, Rubis FLIR pod, and Thomson-CSF Astac ELINT pod.	FR, AD	**UPGRADE PRIORITY** 1. Acquisition of new sensor types providing true multi-spectral capability. 2. Maximum use of existing platform inventory.
Composite Su-24 Fencer E	Su-24MR Fencer E has RDSBO SLAR, Zima IR recon system, Aist-M TV recon system, AFA AP-402M panoramic camera, and AFA A-100 oblique camera. Can be fitted with Kadr camera, and Tangazh ELINT pod.		

GROUND-BASED COMMUNICATION INTERCEPT SYSTEMS

SYSTEM	FREQUENCY RANGE	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
R-381 Turn Series (RS)	HF/VHF	Family of vehicle-mounted communication intercept and DF systems.	FSU	Integration of intercept/DF and jamming capabilities.
SEEKER (UK)	Family of intercept systems operating in the 2-1000 MHz frequency range. System antennas provide bearing accuracy of approx. 2 deg. RMS.	SEEKER I: Mobile HF/VHF/UHF intercept and DF system. A simple, manually operated system. SEEKER II: Automated control of DF; includes tactical computers and data links over combat nets. SEEKER III: Latest version, fully automated	1 country	Increased emphasis on targeting advanced signal modulations, i.e. frequency hoppers. Greatest improvements in detecting and jamming advanced signals, less through improving capabilities
TDF-3100 (IS)	Operates in 1-30 MHz range. Includes built-in single station locator software.	MF/HF commo intercept/DF system. Can be remote located and controlled from an external computer.	1 country	Wide-spread proliferation of EW systems, esp. Middle and Far East.
TDF-1100 (IS)	Operates in 20-1,200 MHz range.	VHF communication intercept/DF system. Can be remote located and controlled from an external computer via serial link or modem/fax interface.	1 country	Increased integration with additional sensor types for target ID and cueing.
RCT-180 (CH)	Probably operates in VHF range. Can determine signal direction for signals with a minimum of 2ms.	Claimed capability of intercepting, DF, tracking/jamming of frequency hopping communication signals. Reportedly employs modern technology including compressive, wideband solid-state high-power amplifier, high-speed synthesizer, and high-speed direction finder. Capable of identifying three nets in nonorthogonal FH network w/ simultaneous jamming three fixed-frequency stations.	1 country	
Composite Ground-based	Operates in VHF range. Can determine signal direction for signals with a minimum of 2ms.	Capabilities to target CNR using slow- and medium-rate frequency hopping signals. Level of automation similar to Seeker II.		**UPGRADE PRIORITY** 1. Increased capability to target advanced signal modulations. 2. Increased frequency coverage. 3. Integration with jammers.

GROUND-BASED INTERCEPT SYSTEMS

SYSTEM	FREQUENCY RANGE	DESCRIPTION/CAPABILITIES	PROLIFERATION	EMERGING TECHNOLOGY/ TRENDS
NRS-1 POLE DISH (RS)	Operates in E/F and I/J bands.	Single dish, jeep or man-portable tripod mounted ELINT system with a 25 km range. Information processing time is 5-7 minutes.	FSU, IZ,	High mobility for increased survivability.
RPS-5/6 TWIN BOX (RS)	Operates in 1-10 GHz.	Mobile, truck, or track-mounted radar intercept and DF system with telescoping antenna.	FSU, IZ, IR	Modular design to meet specific requirements.
ARS-3 TUBE TREE	Operates in the VHF/UHF range.	Mast-mounted intercept and DF system with a complex of antennas.		Integration with threat signal data libraries.
STAIR (FR)	Operates in 0.8-18 GHz (possible extension to 0.5040 GHz). 180 degree FOV (360 deg. w/ 90 deg. sectors available. Accuracy of 2 MHz, 0.5 deg. RMS.	Battlefield radar detection, identification, and DF. Primarily targets ground-based emitters. Includes GPS for precise threat locating.	2 countries	High-speed, wide-band signal processing for near instantaneous signal identification and locating. Increased automation of signal processing and analysis functions.
TAC-WEASEL (UK)	Operates in the 0.7-18 GHz range (extendable to 40 GHz).	Lightweight, mobile ESM/DF system, especially useful for special task forces, border patrols, and special missions.	1 country	Integration with radar-jamming systems.
SENTRY I (UK)	Operates in the I/J bands.	Family of mobile ESM systems, with a modular requirement reconfigurable design. Provides tactical warning for field commanders. Targets include GSR, CM/CB radars, FCR of forward deployed SAMs, and airborne radars.	1 country	
SENTRY II (UK)	Operates in the I/J Bands.	Sentry II provides strategic EOB for corps and army level commanders.	1 country	
WEASEL 2000 (UK)	Operates in the 0.5-40 GHz range. DF accuracy of 1 degree RMS in the 3-40 GHz range. 360 degree instantaneous coverage.	ESM/ELINT system. May be mobile, or used at fixed and temporary sites. Provides fast reaction data collection in dense signal environment. May interface with jammer.	1 country	
Composite Ground-based ELINT system	STAIR system w/integrated EW capability.	Battlefield radar detection, identification, and DF. Includes GPS for precise threat locating.		**UPGRADE PRIORITY** 1. Integrated INTCPT/EW system. 2. Multi-functional capable. 3. High mobility for survivability.